

# OCCASIONAL PAPERS



## Museum of Texas Tech University

Number 238

15 June 2004

### THE MAMMALS OF HOWARD COUNTY, TEXAS

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Howard County provides a unique opportunity for the study of mammalian distributions in Texas. The county is a juncture of three ecotonal regions; the northernmost extension of the Edwards Plateau, the westernmost portion of the Rolling Plains, and the southernmost area of the High Plains or Llano Estacado, with a fourth region, the Chihuahuan Desert, extending to within 50 km west of the county.

Davis and Schmidly (1994) listed 29 species in their distributional maps of Texas mammals from Howard County. Two studies, *The Mammals of the Llano Estacado* (Choate 1997) and *The Mammals of the Edwards Plateau* (Goetze 1998) listed 19 species and 25 species respectively from Howard County. Our study provides a more in-depth and detailed study of Howard County. Three hundred ninety-four specimens were collected and provided a list of 48 species, of which 12 were county records and one a major range extension.

#### DESCRIPTION OF HOWARD COUNTY

Howard County is located at the extreme southern portion of the Texas High Plains (Stoner et al. 1969) between 32°00' and 32°32' N latitude and between 101°10' and 101°42' W longitude (Anon. 1978). The county is approximately 48 km by 48 km encompassing 2334 sq. km. Elevations range from 670 m to 846 m. Mean annual rainfall is 48.8 cm with a growing season of 217 days and the region is classified as semi-arid (Stoner et al. 1969). Mean minimum temperature is -2.2° C in January with a mean maximum of 34.4° C in July (Anon. 2001).

Using Stoner et al. (1969) as a guide, four principle mammal habitats were identified; sandy soil, shallow soil rangeland, limestone ledges and slopes, and riparian. Sandy soil habitat occupies 72% of the county

and lays predominantly in the western portion of the county. It is characterized by undulating dunes with periodic drainage areas. Dominant vegetation includes shin oak (*Quercus havardii*) and grama grasses (*Bouteloua* spp.) with mesquite (*Prosopis glandulosa*) as a common invader. Sandy soil habitat is frequently cultivated. The shallow soil rangeland habitat occupies 23% of the county largely to the east. The soil is loamy and frequently mixed with clay and gravel. Small mesquite and *Opuntia* spp. dominate the vegetation with grama, silver bluestem (*Bothriochloa saccharoides*), buffalo (*Buchloë dactyloides*) and other grasses giving a thin ground cover. Too shallow for cultivation, much of this habitat is grazed by livestock. Limestone ledges and slopes occupy about 5% of the county and is characterized by vertical ledges to un-

dulating slopes. Soils are shallow and loamy with red-berry juniper (*Juniperus pinchotii*) along with an assortment of forbs and grasses as dominant vegetation. This limestone habitat runs east to west just south of Big Spring. Riparian areas cover less than 1% of the county's land area and are characterized by streams

with temporary water and man-made lakes and ponds. Large mesquite and hackberry (*Celtis reticulata*) are common trees with salt cedar (*Tamarix gallica*) and black willow (*Salix nigra*) as common invader shrubs.

## METHODS AND MATERIALS

No methodical survey of Howard County had been conducted prior to this survey, but incidental collecting of specimens had occurred. Prior to the start of this study requests were made to ten collections for mammal records from Howard County. We received ten responses, with four collections reporting specimens from the county that could be used in this study. Specimens collected were located in the Museum of Texas Tech University (TTU), Texas Cooperative Wildlife Collection (TCWC) at Texas A&M University, Midwestern State University Collection of Recent Mammals (MWSU), and the Angelo State Natural History Collection (ASNHC). Fifty-five specimens were housed in the TTU collection (representing 21 species), nine specimens in the TCWC (representing one species), one specimen was located in the MWSU, and eleven specimens in the ASNHC (representing seven species).

Additional collecting began in 1992 and continued to 1999 using Texas Parks and Wildlife permit

SPR-0890-241. For collecting rodents the county was divided into 25 zones, with each zone being approximately 9 km by 9 km. All zones were sampled in at least three locations with 30 folding Sherman live traps (3x3x9 in.) set at each location. Some zones were sampled in as many as six locations depending on the discretion of the investigator, resulting in 89 locations and 2,670 trap nights. Other collecting devices used included Macabee gopher traps, nylon mist nets for bats, and pitfall traps were used to target shrews. Occasionally, Havahart traps were used for medium sized mammals. Larger animals were salvaged from roadsides or supplied by the Big Spring Animal Control office.

Most specimens were prepared as skins with skeletons. Some specimens were prepared as skeleton only or skull only. All specimens collected in this study were deposited in the ASNHC. All locations listed under specimens examined and additional records in the accounts section are reported as recorded on skin tags.

## ACCOUNTS

### *Didelphis virginiana* Kerr Virginia Opossum

The Virginia opossum has been introduced widely in the western United States from its historical range of the eastern United States and Great Plains through Mexico to Central America (McManas 1974). Davis and Schmidly (1994) reported the opossum throughout Texas but not from Howard County. Neither Choate (1997) or Goetze (1998) recorded specimens from Howard County but both report this opossum as common on the Llano Estacado and on the Edwards Pla-

teau, respectively. Yanez and Simpson (2001) first reported this marsupial from Howard County.

All opossum specimens from Howard County were salvaged from roadkills or local animal control. This animal is seen frequently within the City of Big Spring and seems to be abundant throughout all habitats in the county.

Specimens examined (5). – 1.0 mi. S Coahoama, 1; City of Big Spring, 2; 6.7 mi. S, 2.8 E Big Spring, 2.

Additional records (1). – 3.0 mi. NNE Big Spring, 1 (TTU).

*Dasypos novemcinctus* Linnaeus  
Nine-banded Armadillo

The nine-banded armadillo's distribution extends from central South America through Panama into Texas, then north to Nebraska and Iowa, and east along the Gulf of Mexico to Florida. This makes the nine-banded armadillo the most widely distributed edentate (McBee and Baker 1982). Davis and Schmidly (1994), Choate (1997), and Goetze (1998) show Howard County well within the range of this mammal though nearing its western distribution limit, but report no specimens from the county. Yanez and Simpson (2001) first reported the armadillo from Howard County.

Armadillos are uncommon in Howard County, probably due to the small amount of preferred riparian habitat. Both armadillo specimens taken in this study were salvaged as roadkill. Armadillos collected or observed were in the southern portion of the county and associated with riparian or limestone ledges and slope habitats.

Specimens examined (2). – City of Big Spring, 1; 10.0 mi. S, 4.8 E Big Spring, 1.

*Cryptotis parva* (Say)  
Least Shrew

Hall (1981) depicts the distribution of the least shrew through all the eastern United States and Great Plains, then southward to Panama. An unusual gap in central Texas is present in this distribution and that of Davis and Schmidly (1994). Simpson and Maxwell (1989) and Dowler and Boyd (1996) reported *C. parva* from Coke and Tom Green counties, extending this shrew's range northward through the Edwards Plateau. Southward range extensions were reported by Jones et al. (1993), Yancey et al. (1996), and Choate (1997) into Yoakum and Garza counties on the Llano Estacado. During this survey, six specimens of the least shrew were collected from Howard County, extending its range into west-central Texas (Simpson 1999). These specimens fill the large area of west-central Texas left blank on Hall (1981) and Davis and Schmidly's (1994) distributional maps.

Of the six shrews collected in Howard County during this study, three were collected in a sandy habitat, of which one was captured by a feral cat and two were caught in a pitfall trap. The three remaining specimens were caught by hand after the investigators turned over weathered plywood near a dead lake at location, 4.9 mi. W Big Spring, on I-20.

Specimens examined (6). – 3.2 mi. N, 9.8 E Big Spring, 1; 0.9 mi. N, 6.7 W Big Spring, 1; 2.3 mi. S, 4.9 W Big Spring, 3; 1.3 mi. S, 0.5 E Coahoma, 1.

*Lasiurus borealis* (Müller)  
Eastern Red Bat

Eastern red bats are uncommon in Howard County though they range widely through North and South America (Shump and Shump 1982a). This solitary arboreal bat is a year-round resident in east Texas but is thought to be a summer migrant into west Texas (Schmidly 1991). Choate (1997) reported one specimen from Big Spring.

Two specimens of this bat, a lactating female with a juvenile female attached, were collected during this study. They were found dead in a backyard in the City of Big Spring on 23 June 1995.

Specimens examined (2). – City of Big Spring, 2.

Additional records (1). – Big Spring, 1 (TTU) (Choate 1997).

*Lasiurus cinereus* (Palisot de Beauvois)  
Hoary Bat

Though rare in Howard County, this solitary arboreal bat is wide-spread throughout the Americas (Shump and Shump 1982b). The hoary bat is migratory, with females moving through Texas in the spring and fall, whereas males appear to be spring and summer residents (Schmidly 1991). Choate (1997) and Goetze (1998) reported this bat scattered throughout their study areas, though small in numbers.



No specimens of this bat were collected during this study, however one hoary bat specimen was located in the TTU collection.

Additional records (1). – 2.0 mi. N, 2.0 W Forsan, 1(TTU).

*Myotis velifer* (J. A. Allen)  
Cave Myotis

This colonial, cave-dwelling bat occurs from Arizona and Kansas south through Texas and Mexico to Honduras (Fitch et al. 1981). Schmidly (1991) considers this bat to be a year-round resident of Texas. Choate (1997) reported the cave bat only from the northeastern portion of the Llano Estacado. Goetze (1998) reported this bat throughout the Edwards Plateau.

Two badly decomposed specimens of the cave myotis were brought in by a Howard College student after a local resident had discovered them in an open mailbox. No specific gender was determined. These two specimens constitute the first records of this bat from Howard County (Yanez and Simpson 2001).

Specimens examined (2). – City of Big Spring, 2.

*Tadarida brasiliensis* (Geoffroy Saint-Hilaire)  
Brazilian Free-tailed Bat

The Brazilian free-tailed bat is one of the most widely distributed bats studied in this survey. Its range extends from central South America north along the Pacific coast through Central America to the southern half of the United States (Wilkins 1989). This species is highly migratory, arriving in Texas in early spring and forming large concentrated colonies where they raise their young before departing in late fall (Schmidly 1991). Records of this bat are scattered throughout the Llano Estacado (Choate 1997) and Edwards Plateau with Goetze (1998) reporting five Howard County specimens within the ASNHC from one location.

Brazilian free-tailed bats are the most common bat collected in Howard County and are abundant state-

wide. These colonial bats were noted utilizing numerous manmade structures as roosts throughout the Big Spring area.

Specimens examined (5). – City of Big Spring, 2; Big Spring (Howard College Campus), 3.

*Canis latrans* Say  
Coyote

The coyote is widely distributed through all North America and has become highly adapted to human habitation (Bekoff 1977). Davis and Schmidly (1994) show a specimen from Howard County, whereas Choate (1997) and Goetze (1998) reported no coyotes from the county. This animal is reported frequently in all mammalian studies of Texas and seems common in West Texas.

Two specimens of the coyote were collected during this study. The coyote commonly was seen as nonsalvagable roadkills. Additional sightings of live animals occurred during all seasons and in all habitats.

Specimens examined (2). – 7.0 mi. S, 1.5 E Big Spring, 2.

*Urocyon cinereoargenteus* (Schreber)  
Common Gray Fox

Distribution of the common gray fox extends over most of the United States through Central America to Colombia (Fritzell and Haroldson 1982). Howard County is well within the range of this fox but neither Davis and Schmidly (1994), Choate (1997), Goetze (1998) or Yanez and Simpson (2001) reported it from Howard County.

Specimens of the common gray fox collected during this study are the first known specimens from Howard County. Specimens were collected from all habitats except riparian but gray foxes are suspected to utilize that habitat. This fox is considered common for the county.

Specimens examined (7). – 4.5 mi. N, 2.6 E Big Spring, 3; 3.2 mi. N, 4.5 E Big Spring, 1; 2.0 mi. S Big Spring, 2; 0.8 mi. S, 2.4 E Big Spring, 1.

*Vulpes vulpes* (Linnaeus)  
Red Fox

The red fox is the most widely distributed carnivore in the world (LariviPre and Pasitschniak-Arts 1996). Howard County is well within the range of the red fox which covers most of North America, but we consider it rare in Howard County. Choate (1997) reported a specimen from Howard County in his study from the TTU, and Goetze (1998) reported two from the ASNHC.

No specimens of the red fox were collected during this study, but two specimens were located in surveyed collections; one each in the TTU and the ASNHC. Collecting localities of both specimens were in the rangeland habitat of the south and east portions of the county.

Additional records (2). – 5.6 mi. E Big Spring, 1 (TTU); 5.0 mi. S Coahoama, 1 (ASNHC).

*Vulpes velox* (Say)  
Swift or Kit Fox

The taxonomy of this species has been discussed in numerous publications (Mercure et al. 1993; Dragoo et al. 1990; Egosque 1979; McGrew 1979; Creel and Thornton 1971; Thornton et al. 1971). Davis and Schmidly (1994) recognize the swift fox and the kit fox as a single species with two subspecies *Vulpes velox velox* and *V. velox macrotis*. In our study, the swift and kit foxes will be considered one species. Combining Egosque (1979) and McGrew's (1979) distributions of *V. velox* and *V. macrotis*, this fox ranges throughout the Great Plains and the southwestern United States.

Howard County is on the eastern edge of the range of *V. velox*, where it is considered rare. No specimens were collected of this small fox during this study, but two specimens collected in 1970 were found in the ASNHC.

Additional records (2). – 5.0 mi. S Coahoama, 2 (ASNHC).

*Puma concolor* (Linnaeus)  
Mountain Lion

No specimen of the mountain lion was collected during this study but Hall (1981) places Howard County in the middle of its North American range. Numerous residents of Howard County claim to have seen this large cat in recent years, but no physical evidence was collected. Reports of the mountain lion by Engstrom and Maxwell (1988), Boyd et al. (1997), and Goetze (1998) from the Edwards Plateau, Choate (1997) from the Llano Estacado, and Dalquest and Horner (1984) from north-central Texas make the reports of this cat in Howard County plausible.

*Lynx rufus* (Schreber)  
Bobcat

This medium-sized felid ranges across southern Canada through most of the United States and central Mexico (LariviPre and Watson 1997). Davis and Schmidly (1994) report specimens of the bobcat from every county in Texas. Both Choate (1997) and Goetze (1998) reported this cat throughout their study areas and in Howard County.

Four salvaged specimens were collected during this study and numerous nonsalvagable roadkills and sightings were noted in all habitats. Twice during this study bobcats were sighted at midday crossing dead lakes west of Big Spring. The bobcat is common in Howard County and its population appears to be on the increase.

Specimens examined (4). – 18.4 mi. N, 4.1 W Big Spring, 1; 18.3 mi. N, 5.7 W Big Spring, 2; 8.3 mi. S, 1.5 E Big Spring, 1.

Additional records (10). – 1.0 mi. N Big Spring, 1 (TTU); Howard County, 9 (TCWC).

*Conepatus mesoleucus* (Lichtenstein)  
Hog-nosed Skunk

Hall (1981) shows the hog-nosed skunk's range extending from Arizona and Colorado south through Mexico into Honduras with no presence in north Texas

or in the northern panhandle of Texas. Manning et al. (1986) and Davis and Schmidly (1994) depicted a similar distribution in Texas. Goetze (1998) shows a number of records from the Edwards Plateau, whereas Choate (1997) reports only two records from the Llano Estacado. Yanez and Simpson (2001) first reported this animal from Howard County.

Howard County is shown to be on the northern edge of the current Texas range. No specific attempt to trap the hog-nosed skunk was made during this study, but one specimen was salvaged as roadkill and a few nonsalvagable animals were noted. We consider this skunk uncommon in the county.

Specimens examined (1). – 9.9 mi. S, 4.8 E Big Spring, 1.

Additional records (1). – 5.0 mi. S Big Spring, 1 (ASNHC).

*Mephitis mephitis* (Schreber)  
Striped Skunk

The striped skunk's range runs throughout southern Canada, all the United States and into northern Mexico (Wade-Smith and Verts 1982). Both Choate (1997) and Goetze (1998) reported this skunk from Howard County and throughout their study areas.

Although only three striped skunks were salvaged during this study, this animal is considered common in all habitats of Howard County. Frequently this nocturnal animal causes disturbances within the city limits of Big Spring due to their frequent habitation of man-made structures.

Specimens examined (3). – 5.2 mi. N Big Spring, 1; City of Big Spring, 1; Big Spring (Howard College Campus), 1.

Additional records (1). – 1.0 mi. N Big Spring, 1 (TTU).

*Spilogale gracilis* (Merriam)  
Western Spotted Skunk

Verts et al. (2001) place this small skunk in British Columbia then south through the western United States into central Mexico. Davis and Schmidly (1994) and Goetze (1998) depicted the western spotted skunk from Howard County, which is at the eastern distributional limits. Choate (1997) reported no occurrence of *S. gracilis* on the Llano Estacado but does report *S. putorius*, the eastern spotted skunk.

Local Howard County residents have reported spotted skunks in recent years, but no animals were taken during this study. Hollander et al. (1987) reported a male *S. gracilis* found dead on U.S. Highway 87, 11.0 mi. SE of Big Spring in 1986. This skunk is expected but uncommon in Howard County.

Additional records (1). – 11.0 mi. SE Big Spring, 1 (TTU).

*Taxidea taxus* (Schreber)  
American Badger

The badger's range extends from the northeastern United States across southern Canada south through Texas into central Mexico (Long 1973). Choate (1997) reported a specimen from Howard County and numerous specimens throughout the Llano Estacado. Goetze (1998) reported no specimens from Howard County and few from the Edwards Plateau.

Two salvaged specimens were collected during this study. Badger burrows noted during routine trapping provide additional information on the presence of this robust animal. The badger inhabits sandy soil but seems to prefer the rangeland habitat within Howard County. This mammal is considered a rare inhabitant of the county.

Specimens examined (2). – 16.6 mi. N, 16.8 E Big Spring, 1; 3.0 mi. E Big Spring, 1.

Additional records (1). – 10.0 mi. N Big Spring, 1 (TTU).



*Bassariscus astutus* (Lichtenstein)  
Ringtail

The ringtail's distribution extends from southern Mexico north through Texas, California and most of the southwestern United States (Poglayen-Neuwall and Toweill 1988). Choate (1997) reported one Howard County specimen from the MWSU but few from the Llano Estacado, whereas Goetze (1998) reported a specimen from Howard County and numerous additional records throughout the Edwards Plateau.

The ringtail is considered uncommon in Howard County due to the small amount of limestone ledge and slope habitat. No ringtail specimens were collected during this study, but the specimen reported in the MWSU by Choate (1997) and Goetze (1998) is presumed from a limestone ledges and slope habitat south of Big Spring.

Additional records (1). – Big Spring, 1 (MWSU).

*Procyon lotor* (Linnaeus)  
Common Raccoon

The raccoon has a transcontinental range extending from Panama north through the United States and across southern Canada (Lotze and Anderson 1979). Davis and Schmidly (1994), Choate (1997), and Goetze (1998) depicted the raccoon throughout their study areas, but none reported this species from Howard County. Yanez and Simpson (2001) first documented the raccoon from Howard County.

Just four raccoons were collected during this study. With additional live sightings and numerous nonsalvagable animals noted, the raccoon is considered abundant in all habitats of Howard County.

Specimens examined (4). – 16.8 mi. N, 12.0 W Big Spring, 1; 1.8 mi. N, 9.0 E Big Spring, 1; 0.9 mi N, 0.8 E Coahoama, 1; 15.0 mi. E Big Spring, 1.

*Pecari tajacu* (Linnaeus)  
Collared Peccary

Wilson and Reader (1993) place the collared peccary's range from central South America extending northward into central Mexico whereas Hall (1981) shows the range splitting east into Texas and west into Arizona. Davis and Schmidly (1994) depicted Howard County at the northern edge of the peccary's range. Neither Choate (1997) or Goetze (1998) reported this species from Howard County, however Goetze reported several accounts from the western Edwards Plateau.

One specimen of the collared peccary was salvaged during this study from a rangeland habitat in Howard County. This was the first reported occurrence of the collared peccary from the county. One sighting of a small peccary herd occurred at Big Spring Draw in a riparian habitat during this study.

Specimens examined (1). – 4.0 mi. S, 3.4 E Big Spring, 1.

*Odocoileus virginianus* (Zimmerman)  
White-tailed Deer

The white-tailed deer is found throughout the Americas from southern Canada across the Isthmus of Panama to Brazil and Peru. Historically this deer has occupied all this range but not in such abundance as they do today. In the late 1940's, conservation of habitat and enforcement of game laws allowed for a substantial increase in the population of this large game animal (Smith 1991). Though reported throughout Texas where suitable habitat occurs (Davis and Schmidly 1994; Choate 1997; Goetze 1998), Yanez and Simpson (2001) were the first to document this species from Howard County.

Five specimens of the white-tailed deer were collected in Howard County during this study. Several sightings of live white-tailed deer and numerous nonsalvagable roadkills also were observed indicating it is common in all habitats.

Specimens examined (5). – 1.8 mi. N, 9.9 E Big Spring, 1; 1.8 mi. N, 9.0 E Big Spring, 2; 2.3 mi. S, 0.2 E Big Spring, 1; 7.0 mi. S, 1.5 E Big Spring, 1.

*Antilocapra americana* (Ord)  
Pronghorn

O'Gara (1978) places the historical range of the pronghorn from southern Canada south through the western United States into Baja and central Mexico. Davis and Schmidly (1994) place the historical range of this animal in Texas as the western two-thirds of the state, but show the current distribution to be discontinuous and concentrated in the Trans-Pecos and panhandle of Texas. Howard County is well within this historical range and the current distribution of the pronghorn, but neither Choate (1997), Goetze (1998), or Yanez and Simpson (2001) reported it from the county.

One salvaged specimen of the pronghorn was collected from southern Howard County in sandy soil habitat. This is the first report of the pronghorn from Howard County. It is thought to be uncommon in the county, but immediately to the north in Borden County large herds are commonly seen.

Specimens examined (1). – 9.7 mi. S, 1.2 E Big Spring, 1.

*Lepus californicus* Gray  
Black-tailed Jackrabbit

This medium-sized hare inhabits most of the western United States then south through all of Texas to central Mexico including all of Baja (Best 1996). Both Choate (1997) and Goetze (1998) reported the jackrabbit to be common throughout the Llano Estacado and Edwards Plateau. Choate (1997) reported one specimen of *L. californicus* from Howard County.

Four specimens were salvaged during this study from sandy soil and rangeland habitats. Additional live sightings and nonsalvagable animals were noted from these habitats where it is common. Riparian and limestone ledge and slopes are not desirable habitats for this hare, and it is considered rare in those areas.

Specimens examined (4). – 1.5 W Vealmoor, 2; 1.4 mi. N, 9.3 E Big Spring, 1; 9.7 mi. S, 3.6 W Big Spring, 1.

Additional records (2). – 3.0 mi. N Big Spring, 1 (TTU); 5.0 mi. S Big Spring, 1 (TTU).

*Sylvilagus audubonii* (Baird)  
Desert Cottontail

Desert cottontails range from central Mexico north to northern California, Montana, and North Dakota taking in the western two-thirds of Texas (Hall 1981; Wilson and Reeder 1993). Choate (1997) and Goetze (1998) reported this rabbit throughout their study areas with both reporting a Howard County specimen in the ASNHC. No specimens were obtained during this study.

*Sylvilagus audubonii* and *S. floridanus* utilize the same habitats, sandy and rangeland, but the desert cottontail occurs less frequently and is considered uncommon in Howard County.

Additional Records (1). – Big Spring, 1 (ASNHC).

*Sylvilagus floridanus* (J. A. Allen)  
Eastern Cottontail

The eastern cottontail's range extends from Venezuela and Colombia through central America into most of Texas to the Great Plains and all the eastern United States (Hall 1981; Wilson and Reeder 1993). Choate (1997) reported two specimens from Howard County with numerous other specimens from the Llano Estacado. Several specimens are reported from the Edwards Plateau by Goetze (1998), with one from Howard County.

Three specimens were located during this study, all in the ASNHC. Despite the lack of specimens, the eastern cottontail is thought to be common in Howard County.

Additional Records (3). – 3.0 mi. W Luther, 1 (ASNHC) (Choate 1997); S Big Spring, 2 (ASNHC).

*Cynomys ludovicianus* (Ord)  
Black-tailed Prairie Dog

In the late 1800's the black-tailed prairie dog was estimated to have numbered in the billions within its range which covered most of the Great Plains. Due to habitat destruction this member of the squirrel family has experienced a great reduction in its population.



They now occur only in isolated colonies throughout their historical range (Hoogland 1996). Choate (1997) reported the prairie dog throughout the Llano Estacado. Goetze (1998) depicted this species from the northern half of the Edwards Plateau and one specimen from Howard County.

All specimens collected during this study were from one location west of Big Spring, but “towns” at the Big Spring Air Park and Big Spring State Park are known to exist. Three specimens (ASNHC 8508, 8509, and 8511) collected on the 5 and 6 of March 1993 were pregnant with 3, 5, and 3 embryos respectively.

Specimens examined (10). – 2.4 mi. S, 6.9 W Big Spring, 10.

Additional records (1). – Big Spring Air Park, 1 (TTU).

*Sciurus niger* Linnaeus  
Eastern Fox Squirrel

Koprowski (1994) reports the eastern fox squirrel throughout the eastern United States and Great Plains including north and central Texas. Goetze (1998) depicted the fox squirrel throughout most of the Edwards Plateau. Choate (1997) reported fewer records and those were largely from the eastern and northern caprock of the Llano Estacado.

One female squirrel was caught in Howard County during this study. The specimen was trapped with a Havahart trap in a pecan orchard in a riparian setting. The 80 year-old landowner reported that fox squirrels have been common at that location since “he was a young boy”. This specimen constitutes a Howard County record (Yanez and Simpson 2001) and according to Davis and Schmidly’s (1994) Texas distribution, a slight range extension to the north and west.

Specimens examined (1). – 2.3 mi. S, 0.2 E Big Spring, 1.

*Spermophilus mexicanus* (Erxleben)  
Mexican Ground Squirrel

Howard County is to the northern extreme of the range of the Mexican ground squirrel, which extends from central Texas west across southeastern New Mexico then south to central Mexico (Young and Jones 1982). Choate (1997) and Goetze (1998) reported specimens from Howard County in their studies, and Boyd et al. (1997) reported this species from Tom Green County to the south.

The Mexican ground squirrel is known to occur in all four habitats of Howard County and is considered common. In our study, specimen ASNHC 8519 was lactating when caught 27 May 1994. Specimen ASNHC 8523, collected on 3 June 1994, was pregnant with seven embryos.

Specimens examined (8). – 9.0 mi. N, 3.7 E Big Spring, 1; Big Spring (Howard College Campus), 2; 4.2 mi. W Big Spring, 1; 2.4 mi. S, 6.9 W Big Spring, 1; 9.7 mi S, 3.6 W Big Spring, 3.

Additional records (1). – 8.0 mi. S Big Spring, 1 (TTU).

*Spermophilus spilosoma* Bennett  
Spotted Ground Squirrel

The spotted ground squirrel ranges from Nebraska south to Utah and Oklahoma through Texas and New Mexico and south to central Mexico (Streubel and Fitzgerald 1978; Hall 1981). Goetze (1998) reported this ground squirrel from Howard County and Choate (1997) reported it to the north and west of the county in Martin and Dawson counties.

*S. spilosoma* is uncommon in Howard County. One lactating female specimen (ASNHC 10207) was captured during this study on 6 July 1995 from a sandy soil habitat.

Specimens examined (1). – 3.2 mi. N, 0.7 E Big Spring, 1.

Additional records (2). – Elbow, 1 (TTU); Big Spring, 1 (ASNHC).

*Geomys bursarius* (Shaw)  
Plains Pocket Gopher

The plains pocket gopher's distribution extends from southern Manitoba through the plains states to southern Texas (Jones et al. 1985). Historically, *Geomys bursarius* was considered one wide ranging, but morphologically variable, species. However, recent use of biochemical technology has identified five species of *Geomys* in the region of Texas formerly recognized as the range of *G. bursarius*; the five species are *G. bursarius*, *G. attwateri*, *G. breviceps*, *G. knoxjonesi*, and *G. texensis* (Davis and Schmidly 1994). Howard County falls within the range of *Geomys bursarius*. Choate (1997) reported the plains pocket gopher from Howard County and northwest through the central Llano Estacado. Goetze (1998) reported this species from Howard, Nolan, and Runnels Counties in the extreme northern Edwards Plateau.

All specimens caught during this study in Howard County were from the sandy soil. Additional mounds seen in this gopher's preferred sandy habitats throughout the county suggest that this gopher is common.

Specimens examined (20). – 4.6 mi. N, 2.7 E Big Spring, 1; 1.8 mi. N, 9.0 E Big Spring, 2; 1.6 mi. N, 1.25 E Big Spring, 2; 1.5 mi. N, 9.0 E Big Spring, 1; 1.5 mi. N Big Spring, 1; 1.0 mi. N, 1.3 E Big Spring, 1; 1.0 mi. N Big Spring on Hwy 669, 2; 7.5 mi. W Big Spring, 1; 2.8 mi S, 6.0 W Big Spring, 1; 3.1 mi. S, 0.6 E Big Spring, 1; 3.2 mi. S, 1.0 E Big Spring, 1; 3.2 S, 1.1 E Big Spring, 3; 3.25 mi. S, 0.6 E Big Spring, 2; 8.6 mi. S, 10.0 W Big Spring, 1.

Additional records (7). – 2 mi. N Big Spring, 1 (TTU); 2 mi. NE Big Spring, 2 (TTU); 9 mi. N Big Spring, 1 (TTU); Big Spring, 2 (TTU); Big Spring Area, 1 (ASNHC).

*Cratogeomys castanops* (Baird)  
Yellow-faced Pocket Gopher

The yellow-faced pocket gopher ranges from Colorado and Kansas south through eastern New Mexico and west Texas to northeastern Durango (Davidow-Henry et al. 1989). Choate (1997) reported this gopher from Howard County and throughout the Llano Estacado. Goetze (1998) reported the yellow-

faced pocket gopher from Howard County and five additional counties in the extreme northwestern Edwards Plateau.

Only one male specimen was captured during this study with a Macabee trap in sandy soil habitat. Location information from the two additional records from the TTU and the ASNHC also were located in sandy soil. This large gopher is considered uncommon in Howard County.

Specimens examined (1). – 3.1 mi. S, 6.7 W Big Spring, 1.

Additional records (2). – 1.5 mi. WSW Vealmoor, 1 (TTU); Big Spring, 1 (ASNHC).

*Chaetodipus hispidus* Baird  
Hispid Pocket Mouse

The hispid pocket mouse ranges from the Dakotas through the Great Plains and Texas south into central Mexico (Paulson 1988). Choate (1997) reported this pocket mouse from four locations in the sandy habitat of Howard County and throughout most of the Llano Estacado. Goetze (1998) reported this mouse from Howard County and throughout the northern and eastern Edwards Plateau.

Eight specimens of the hispid pocket mouse were collected in the sandy habitat and four were captured in the shallow soil rangeland habitat of eastern Howard County. Two specimens, ASNHC 8537 and 8538, were captured on 2 and 3 June 1994. Both mice were pregnant with two and five embryos respectively.

Specimens examined (12). – 17.0 mi. N, 10.0 W Big Spring, 2; 16.6 mi. N, 4.0 E Big Spring, 1; 13.6 mi. N, 4.0 W Big Spring, 1; 9.0 mi. N, 9.5 W Big Spring, 2; 4.5 mi. N, 5.5 E Big Spring, 1; 1.3 mi. N, 14.1 E Big Spring, 1; 1.2 mi. N, 13.2 E Big Spring, 1; 4.8 mi. S, 3.9 E Big Spring, 1; 8.6 mi. S, 12.0 W Big Spring, 1; 10.6 mi. S, 9.9 W Big Spring, 1.

Additional records (6). – 2.5 mi. WSW Vealmoor, 1 (TTU); 2 mi. S, 0.5 W Luther, 1 (TTU); 2.5 mi. S, 3.5 W Luther, 1 (TTU); 3.5 mi. S, 2.5 E Luther, 1 (TTU); 3 mi. S, 3.5 W Luther, 1 (TTU); 9 mi. S, 2.0 W Big Spring, 1 (TTU).

*Perognathus flavescens* Merriam  
Plains Pocket Mouse

The plains pocket mouse ranges from North Dakota and Minnesota southward through Colorado, New Mexico and Texas to northern Chihuahua (Monk and Jones 1996). Davis and Schmidly (1994) reported this species in the panhandle of Texas with a record from Howard County at the southern extreme of its distribution. Neither Choate (1997) or Goetze (1998) reported this specimen from Howard County, but Choate (1997) depicted this mouse to be widely distributed throughout the Llano Estacado.

No specimen of the plains pocket mouse was captured during this study but one specimen (TTU 63477) was located. According to the catalogued location this specimen would have been captured in a sandy soil habitat.

Additional records (1). – 9.0 mi. S, 2.0 W Big Spring, 1 (TTU).

*Perognathus flavus* Baird  
Silky Pocket Mouse

The taxonomy of *Perognathus flavus* has been in question over the past years as to it being one species with distinct subspecies or multiple species. Jones and Jones (1992), Wilson and Reader (1993), Choate (1997), and Goetze (1998) all designate this mammal to be one species. Lee and Engstrom (1991), Davis and Schmidly (1994), Best and Skupski (1994a), and Best and Skupski (1994b) split the species into *P. flavus* and *P. merriami*. Most agree that more research is needed to solve this taxonomic problem.

Choate (1997) and Goetze (1998) reported under additional records one specimen each from Howard County with no specific locations. These may be the same specimen and they were not located in any responding mammal collections.

One specimen of this pocket mouse was captured during this study in sandy soil habitat and was cataloged as *P. flavus*.

Specimens examined (1). – 3.2 mi. N, 0.7 E Big Spring, 1.

Additional records (2). – Big Spring, 1 (Choate 1997); Howard County, 1 (Goetze 1998).

*Dipodomys merriami* Mearns  
Merriam's Kangaroo Rat

The range of Merriam's kangaroo rat extends from Nevada south and southeast into Baja and western Texas then to central Mexico. Choate (1997) depicted specimens from the Texas Permian Basin and Lee County, New Mexico. Goetze (1998) reported locations in four counties of the northeastern Edwards Plateau. Neither Choate (1997), Goetze (1998) or Yanez and Simpson (2001) reported this rat from Howard County.

One specimen of Merriam's kangaroo rat was captured during this study in sandy soil habitat. This provides the first record of *D. merriami* from Howard County, and a slight range extension to the east according to Davis and Schmidly's (1994) Texas distribution.

Specimens examined (1). – 4.5 mi. N, 7.3 E Big Spring, 1.

*Dipodomys ordii* Woodhouse  
Ord's Kangaroo Rat

Garrison and Best (1990) show Howard County well inside the range of the Ord's kangaroo rat that extends from the northern Great Plains west to Oregon and eastern California then south to Hidalgo. Davis and Schmidly (1994) reported a record of *D. ordii* from Howard County. Choate (1997) and Goetze (1998) reported this kangaroo rat as common in their studies, but neither report a specimen from Howard County.

Specimens caught during this study were from sandy soil habitats. The Ord's kangaroo rat was expected in Howard County and is a common resident due to the abundance of sandy soil habitat. Two specimens were captured pregnant (2 embryos each); ASNHC 8003 was caught 14 March 1992 and ASNHC 10214 was caught 31 December 1995.



Specimens examined (15). – 7.1 mi. N, 8.8 W Big Spring, 2; 4.6 mi. N, 2.7 E Big Spring, 2; 1.0 mi. N Big Spring on Hwy 669, 2; 0.8 mi. N, 3.5 W Big Spring, 1; 0.1 mi. N, 7.8 W Big Spring, 5; 2.3 mi. S, 4.1 W Big Spring, 1; 2.4 mi. S, 5.3 W Big Spring, 2.

*Mus musculus* Linnaeus  
House Mouse

European by origin, this non-native rodent is known to live in close association with humans, making use of manmade structures and the surrounding habitats throughout the United States (Davis and Schmidly 1994). The house mouse is found in sandy soil and shallow soil rangeland habitats but is thought to occur throughout Howard County in all habitats.

Specimens examined (7). – 11.7 mi. N, 0.9 E Big Spring, 3; 7.1 mi. N, 8.8 W Big Spring, 1; 1.3 mi. N, 14.1 E Big Spring, 1; 1.2 mi. N, 13.2 E Big Spring, 1; 4.6 mi. S, 2.8 E Big Spring, 1.

*Baiomys taylori* (Thomas)  
Northern Pygmy Mouse

*Baiomys taylori* ranges from central Mexico north in three directions; one along the western coast of Mexico, one through Durango and Chihuahua, and a third through central and east Texas to the Oklahoma state line (Eshelman and Cameron 1987). Davis and Schmidly (1994) depicted the pygmy pocket mouse throughout central Texas and the panhandle and then extending to the Gulf Coast. Choate (1997) recorded eight specimens from Howard County and more throughout the eastern Llano Estacado. Goetze (1998) reported five specimens from Howard County and several more records from the Edwards Plateau.

This small mouse was captured entirely in sandy soil habitat of Howard County but should be found throughout the county in small numbers. Two females, ASNHC 8549 and 8550, captured on 27 and 28 May 1994, were both pregnant with three embryos each.

Specimens examined (4). – 0.1 mi. N, 7.8 W Big Spring, 1; 2.3 mi. S, 4.1 W Big Spring, 1; 8.4 mi. S, 4.0 W Big Spring, 1; 5.4 mi. S, 10.7 W Big Spring, 1.

Additional records (10). – 1.0 mi. N Luther, 4 (TTU); 1.0 mi. S Luther, 1 (TTU); 2.5 mi. W Forsan, 2 (TTU); 3.5 mi. S, 5.0 W Big Spring, 3 (TTU).

*Neotoma leucodon* Merriam  
Eastern White-throated Wood Rat

Goetze (1998), Choate (1997), and Davis and Schmidly (1994) reported this wood rat as *N. albigula*. Recent molecular studies by Edwards et al. (2001) found that *N. albigula* located east of the Rio Grande in New Mexico and Texas and east of the Rio Conchos in northern Mexico vary significantly from those located to the west and should be reassigned as *Neotoma leucodon*.

Davis and Schmidly (1994) report Howard County on the eastern edge of this rat's range. Goetze (1998) reported a specimen from the extreme southern portion of Howard County and throughout the Edwards Plateau. Choate (1997) recorded no specimens from Howard County, but reported numerous specimens collected around the perimeter of the Llano Estacado.

This large wood rat was found in abundance in all habitats of Howard County except riparian. Although found in three of the four habitats, it appears that vegetation, especially *Opuntia* spp., plays a large role in its habitat selection. At one location, 4.8 mi. S, 3.9 E Big Spring, *N. leucodon* was sympatric with *N. micropus*.

Specimens examined (15). – 12.0 mi. N, 9.8 E Big Spring, 1; 11.7 mi. N, 13.8 E Big Spring, 1; 10.2 mi. N, 6.8 E Big Spring, 2; 1.5 mi. N, 8.0 E Big Spring, 5; 4.0 mi. S, 3.4 E Big Spring, 3; 4.8 mi. S, 3.9 E Big Spring, 1; 6.0 mi. S, 2.8 E Big Spring, 1; 10.0 mi. S, 12.0 E Big Spring, 1.

*Neotoma micropus* Baird  
Southern Plains Wood Rat

Howard County is well within the known range of the southern plains wood rat which extends from the southern Great Plains, southward through New Mexico, western and southern Texas to Veracruz (Braun and Mares 1989). Davis and Schmidly (1994),

Choate (1997), and Goetze (1998) reported specimens from Howard County, and it appears to be common throughout the county and state.

Specimens caught during this study were from all habitats except riparian but, unlike *N. leucodon*, this wood rat appears to make more use of rocky outcrops. At one location, 4.8 mi. S, 3.9 E Big Spring, *N. micropus* was sympatric with *N. leucodon*.

Specimens examined (26). – 17.5 mi. N, 8.4 W Big Spring, 1; 16.6 mi. N, 4.0 E Big Spring, 1; 16.2 mi. N, 12.6 E Big Spring, 1; 16.0 mi. N, 0.8 W Big Spring, 2; 15.9 mi. N, 10.6 E Big Spring, 1; 10.4 mi. N, 9.9 E Big Spring, 1; 7.4 mi. N, 13.0 E Big Spring, 1; 5.1 mi. N, 7.3 E Big Spring, 1; 4.0 mi. N, 13.8 E Big Spring, 1; 3.2 mi. N, 0.7 E Big Spring, 1; 1.3 mi. N, 14.1 E Big Spring, 1; 1.2 mi. N, 13.2 E Big Spring, 1; 1.0 mi. N, 2.6 E Big Spring, 1; 0.9 mi. N, 14.0 E Big Spring, 1; 0.9 mi. N, 8.4 W Big Spring, 1; 0.1 mi. N, 7.8 W Big Spring, 3; 2.4 mi. S, 15.9 E Big Spring, 4; 2.4 mi. S, 5.3 W Big Spring, 1; 4.8 mi. S, 3.9 E Big Spring, 1; 10.4 S, 3.7 E Big Spring, 1.

Additional records (2). – 2.5 mi. WSW Vealmoor, 2 (TTU).

*Reithrodontomys megalotis* (Baird)  
Western Harvest Mouse

Webster and Jones (1982) report the western harvest mouse from southwestern Canada south to the Yucatan Isthmus and from Indiana west to the Pacific coastline. Choate (1997) reported specimens from Howard County and throughout the Llano Estacado. Goetze (1998) reported this mouse only from the northern extremes of the Edwards Plateau in Howard and Glasscock Counties.

Howard County is on the western edge of this mouse's range (Davis and Schmidly 1994). It appears to be common within the county. During this study, this species was captured entirely in the sandy soil habitat of western Howard County.

Two females caught in this study were pregnant. One (ASNHC 8611) was captured 15 March 1993 with three embryos; the second (ASNHC 10297) was trapped 31 December 1995 with four embryos.

Specimens examined (5). – 7.1 mi. N, 8.8 W Big Spring, 1; 1.8 mi. N, 9.9 E Big Spring, 1; 0.9 mi. N, 10.8 W Big Spring, 2; 2.3 mi. S, 4.1 W Big Spring, 1.

Additional records (14). – 1.0 mi. N Luther, 3 (TTU); 1.0 mi. S Luther, 2 (TTU); 3.5 mi. S, 5.0 W Big Spring, 4 (TTU); 9.0 mi. S, 2.0 W Big Spring, 5 (TTU).

*Reithrodontomys montanus* (Baird)  
Plains Harvest Mouse

Plains harvest mice range from the southern Great Plains south to central Texas, then southwestward into Arizona, most of Chihuahua and northern Durango (Wilkins 1986). Choate (1997) reports this mouse from Howard County and throughout the Llano Estacado. Although no specimens were reported from Howard County by Goetze (1998) he does report several locations from the northern and eastern portions of the Edwards Plateau.

This small mouse inhabits both the sandy soil and the rangeland habitats of Howard County. Nine specimens of this animal were captured during this study, and the plains harvest mouse is thought to be common within the county.

Specimens examined (9). – 16.2 mi. N, 12.6 E Big Spring, 1; 11.7 mi. N, 0.9 E Big Spring, 1; 4.5 mi. N, 7.3 E Big Spring, 1; 2.5 mi. N, 3.8 E Big Spring, 1; 0.1 mi. N, 7.8 W Big Spring, 4; 4.8 mi. S, 4.6 E Big Spring, 1.

Additional records (1). – 2.5 mi. WSW Vealmoor, 1 (TTU).

*Peromyscus attwateri* J. A. Allen  
Texas Mouse

Schmidly (1974) describes the range of the Texas mouse as a discontinuous range through central Oklahoma and central Texas where suitable rocky habitat exists. Choate (1997) does not report specimens from Howard County, but his distributional map of *P. attwateri* shows numerous records along the caprock of the eastern Llano Estacado. Goetze (1998) reported three specimens from Howard County limestone out-

crops and numerous specimens throughout the Edwards Plateau.

Texas mice were found only in the limestone ledges and slopes habitat in Howard County. This long-tailed mouse is thought to be abundant in this habitat but is not expected in the other three established habitats in the county.

Two female mice (ASNHC 10239 and 10246) caught on 10 and 12 December 1994 were both pregnant with two embryos each.

Specimens examined (26). – 1.7 mi. S, 2.7 E Big Spring, 4; 1.7 mi. S, 2.4 E Big Spring, 5; 4.0 mi. S, 3.4 E Big Spring, 6; 4.4 mi. S, 15.9 E Big Spring, 1; 4.8 mi. S, 3.9 E Big Spring, 7; 6.0 mi. S, 2.8 E Big Spring, 1; 10.0 mi. S, 12.0 E Big Spring, 2.

*Peromyscus leucopus* (Rafinesque)  
White-footed Mouse

The white-footed mouse has one of the largest distributions of mammals in North America. The range extends through all of the eastern United States and Great Plains, then southward through Mexico to the Yucatan Peninsula (Lackey et al. 1985). It is reported in most distributional studies in Texas.

The white-footed mouse was the most abundant mammal in Howard County and was found in high numbers in all four habitats. Possible field misidentifications may have occurred, especially in juvenile *P. maniculatus* who are sympatric with the white-footed mouse.

Specimens examined (65). – 17.6 mi. N, 2.8 W Big Spring, 8; 17.6 mi. N, 1.1 W Big Spring, 3; 16.5 mi. N, 1.0 W Big Spring, 1; 16.4 mi. N, 1.2 W Big Spring, 1; 16.0 mi. N, 0.8 W Big Spring, 5; 13.6 mi. N, 4.0 W Big Spring, 1; 12.0 mi. N, 9.8 E Big Spring, 1; 10.4 mi. N, 9.9 E Big Spring, 1; 10.2 mi. N, 6.8 E Big Spring, 1; 10.1 mi. N, 6.6 E Big Spring, 2; 9.6 mi. N, 4.4 W Big Spring, 3; 9.5 mi. N, 6.4 E Big Spring, 1; 4.7 mi. N, 16.0 E Big Spring, 2; 4.5 mi. N, 7.3 E Big Spring, 1; 4.0 mi. N, 13.8 E Big Spring, 1; 3.4 mi. N, 0.7 E Big Spring, 2; 1.8 mi. N, 9.9 E Big Spring, 1; 1.2

mi. N, 13.2 E Big Spring, 1; 0.9 mi. N, 14.0 E Big Spring, 2; 0.9 mi. N, 8.4 W Big Spring, 1; 0.9 mi. N, 8.0 W Big Spring, 1; 0.9 mi. N, 6.0 W Big Spring, 2; 0.8 mi. N, 3.5 W Big Spring, 1; Big Spring (Howard College Campus), 1; City of Big Spring, 1; 0.1 mi. S, 7.0 E Big Spring, 1; 0.5 mi. S, 13.2 E Big Spring, 1; 1.7 mi. S, 2.7 E Big Spring, 1; 2.3 mi. S, 4.1 W Big Spring, 1; 2.3 mi. S, 4.9 W Big Spring, 1; 2.4 mi. S, 15.9 E Big Spring, 3; 2.4 mi. S, 5.3 W Big Spring, 2; 4.8 mi. S, 3.9 E Big Spring, 2; 5.4 mi. S, 9.9 W Big Spring, 1; 6.4 mi. S, 2.4 W Big Spring, 2; 7.1 mi. S, 15.1 E Big Spring, 1; 7.3 mi. S, 17.3 E Big Spring, 2; 8.6 mi. S, 1.0 W Big Spring, 1; 10.0 mi. S, 10.2 E Big Spring, 1.

Additional records (1). – 2.5 mi. W Forsan, 1 (TTU).

*Peromyscus maniculatus* (Wagner)  
Deer Mouse

This wide ranging mouse extends from Alaska and northern Canada through much of the United States into Baja and southern Mexico (Wilson and Reeder 1993; Hall 1981). Davis and Schmidly (1994) reported the deer mouse throughout Texas. Choate (1997) and Goetze (1998) reported specimens from Howard County as well as throughout their study areas.

The deer mouse is the second most abundant mammal in Howard County. It is found in all habitats of the county. Possible field misidentifications may have occurred especially in juvenile *P. leucopus* who are sympatric with the deer mouse.

Specimens examined (61). – 18.4 mi. N, 4.1 W Big Spring, 1; 17.6 mi. N, 1.1 W Big Spring, 1; 11.7 mi. N, 0.9 E Big Spring, 4; 10.4 mi. N, 9.9 E Big Spring, 1; 10.2 mi. N, 6.8 E Big Spring, 3; 9.6 mi. N, 4.4 W Big Spring, 2; 7.1 mi. N, 8.8 W Big Spring, 2; 5.1 mi. N, 7.3 E Big Spring, 3; 4.6 mi. N, 2.7 E Big Spring, 2; 4.0 mi. N, 13.8 E Big Spring, 1; 2.5 mi. N, 3.8 E Big Spring, 4; 1.8 mi. N, 9.9 E Big Spring, 3; 1.5 mi. N, 9.0 E Big Spring, 2; 0.9 mi. N, 14.0 E Big Spring, 3; 0.9 mi. N, 6.0 W Big Spring, 2; 0.9 mi. N, 8.0 W Big Spring, 5; 0.9 mi. N, 8.4 W Big Spring, 2; 0.9 mi. N, 10.8 W Big Spring, 2; 0.1 mi. N, 7.8 W Big Spring, 1; Big Spring (Howard College Campus), 1;



2.4 mi. S, 5.3 W Big Spring, 3; 2.4 mi. S, 15.9 W Big Spring, 1; 3.1 mi. S, 6.7 W Big Spring, 2; 4.8 mi. S, 3.9 E Big Spring, 2; 5.7 mi. S, 15.9 E Big Spring, 1; 6.4 mi. S, 2.4 W Big Spring, 1; 9.7 mi. S, 1.2 E Big Spring, 5; 10.4 mi. S, 3.7 E Big Spring, 1.

*Onychomys leucogaster* (Wied-Neuwied)  
Northern Grasshopper Mouse

Howard County is well within the range of the northern grasshopper mouse with suitable sandy habitat. The range extends from south-central Canada south to the Great Plains, northwestern United States and the Great Basin into Texas and northeastern Mexico (McCarty 1978; Hall 1981). Choate (1997) does not report the grasshopper mouse from Howard County, but does show it to be common throughout the Llano Estacado. Goetze (1998) reported a single specimen from Howard County from an unspecified location. He reported only four other specimens in his study from Crane, Concho, Crockett, and Val Verde counties, all in the northern Edwards Plateau.

One specimen of the grasshopper mouse was recorded in this study. The specimen was salvaged within a large black-tailed prairie dog colony in shallow soil rangeland habitat. The dead specimen was fresh and appeared to be a lost prey item with what appeared to be saliva on the fur.

Specimens examined (1). – 2.4 mi. S, 6.9 W Big Spring, 1.

Additional records(1). – Howard County, 1 (Goetze 1998).

*Sigmodon hispidus* Say and Ord  
Hispid Cotton Rat

Cameron and Spencer (1981) show the hispid cotton rat inhabiting the coastal areas of northern South America through Central America into the southern United States. It is found throughout Texas (Davis and Schmidly 1994), and both Choate (1997) and Goetze (1998) reported it as common in the Llano Estacado and Edwards Plateau.

This medium-sized rat was the third most frequently trapped mammal from Howard County. It is found in large numbers within all described habitats.

Specimens examined (47). – 17.6 mi. N, 1.1 W Big Spring, 1; 16.6 mi. N, 4.0 E Big Spring, 1; 16.5 mi. N, 1.0 W Big Spring, 5; 14.1 mi. N, 0.9 E Big Spring, 2; 11.7 mi. N, 0.9 E Big Spring, 2; 11.5 mi. N, 3.6 W Big Spring, 3; 9.6 mi. N, 4.4 W Big Spring, 1; 9.5 mi. N, 6.4 E Big Spring, 2; 7.7 mi. N, 2.4 W Big Spring, 1; 7.1 mi. N, 8.8 W Big Spring, 2; 4.0 mi. N, 13.8 E Big Spring, 2; 3.4 mi. N, 0.7 E Big Spring, 2; 1.8 mi. N, 9.9 E Big Spring, 1; 1.5 mi. N, 9.0 E Big Spring, 1; 1.3 mi. N, 14.1 E Big Spring, 1; 1.2 mi. N, 13.2 E Big Spring, 2; 0.1 mi. N, 7.8 W Big Spring, 2; 2.3 mi. S, 4.1 W Big Spring, 3; 2.4 mi. S, 15.9 E Big Spring, 5; 6.4 mi. S, 2.4 W Big Spring, 3; 7.0 mi. S, 9.8 W Big Spring, 2; 7.1 mi. S, 15.1 E Big Spring, 1; 10.4 mi. S, 3.7 E Big Spring, 2.

*Erethizon dorsatum* (Linnaeus)  
Porcupine

The porcupine ranges from Alaska and Labrador south through California and Tennessee into central Texas to Durango (Hall 1981; Wilson and Reeder 1993). Davis and Schmidly (1994) reported the porcupine throughout the western two-thirds of Texas and from Howard County. Choate (1997) and Goetze (1998) showed this species throughout the Llano Estacado and Edwards Plateau with Choate (1997) reporting a specimen from Howard County through his literature search citing Milstead and Tinkle (1958).

During this study two specimens were recovered as roadkills. One specimen was salvaged from limestone ledge and slope habitat, while the second was from rangeland habitat. Additional sightings place this mammal in all four defined habitats, and it is thought to be common in Howard County.

Specimens examined (2). – 0.7 mi. E Big Spring, 1; 0.7 mi. S Big Spring, 1.

Additional Records (1). – Between Ackerly and Big Spring, 1 (Milstead and Tinkle 1958).

## DISCUSSION

Forty-eight species representing 38 genera and 8 orders of mammals are known to occur in Howard County. In this study, 12 species were reported as county records, with one species (*Cryptotis parva*) being a major range extension. Future studies may provide additional species whose ranges include Howard County or those whose ranges extend close to the county.

With continued sampling we believe at least four additional mammals could be verified as occurring in Howard County:

*Notiosorex crawfordi* Coues, 1877 (desert shrew). – Howard County is well inside the documented range of this animal. Davis and Schmidly (1994) reported this shrew from Howard County but no voucher specimen was located in responding mammal collections.

*Lasionycteris notivagans* (Le Conte, 1831) (silver-haired bat). – The distribution of this bat is very erratic within Texas (Davis and Schmidly 1994), and would be an occasional, but rare, migrant in Howard County.

*Pipistrellus hesperus* (H. Allen, 1864) (western pipistrelle). – This small bat will likely be found in Howard County, though infrequently.

*Corynorhinus townsendii* Cooper, 1837 (Townsend's big-eared bat). – Howard County is on the eastern edge of this bat's range. Both Choate (1997) and Goetze (1998) report it in their studies. Presumably this animal will be captured near limestone ledges and slope habitat.

## ACKNOWLEDGMENTS

We would like to thank the Louis Stokes Alliance for Minority Participation for helping fund this project and the Saunders McLaughlin Trust Scholarship for assisting student researchers. We are grateful to Dr. Robert Dowler and his assistants, present and past, for helping in the identification and cataloguing of Howard County specimens into the Angelo State Natural History Collection. We would like to acknowledge the following individuals for their help in locating and/or the collecting of specimens; Bobby Armstrong, Paul Ausmus, Jeremiah Best, Jeff Birdwell, Tony Claxton, Grace Clemons, Chestly Cotton, Darin Carroll, Angela DeJesus, Cole Furqueron, Phillip Furqueron, Dr.

Gary Grant, Kellie Hinojos, Clay Ingram, Craig Ingram, Johnny Jackson, Luis Kincaide, Dora Lozano, Bob Lewis, Bennie McChristian, Robert Miller, Mark Morgan, Steve Moses, Yldifonso Narbaiz, Jessica Paredes, Clovis Phinney, Lucas Phinney, Ronald Phinney, Marcia Revelez, Harvey Rothell, David Roueche, Houston Rutledge, John Scott, Lonnie Smith, Ricky Yanez and Vanessa Yanez. We also extend our appreciation to Dr. Robert Bradley, Dr. Robert J. Baker, Dr. Clyde Jones, Michael Nickell, Dr. Ned Strenth, Julia Trevino, Sara Wilkins and Sandra Woods for reviewing this and other manuscripts dealing with Howard County mammals.

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